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Viral Loads among Young HIV-Infected Men with Early Syphilis

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Abstract

High rates of HIV coinfection among men with syphilis suggest HIV transmission opportunities due to biologic and behavioral risk synergy. We abstracted HIV viral loads for HIV-infected males aged 24 years or younger with a diagnosis of early syphilis (ES) in Maricopa County, Arizona, in order to evaluate HIV infectivity. During 2009 to 2012, there were 56 HIV-infected, ES cases meeting the age criteria, of whom 32 (57%) had a detectable viral load performed within 1 year of syphilis diagnosis (median 21 000 copies/mL, range 130–302 844 copies/mL). Only 4 (7%) of the 56 patients had an undetectable viral load (<100 copies/mL) reported within a year of syphilis diagnosis. Twenty (36%) had no reported viral load or a viral load collected after 1 year of syphilis diagnosis. Among this group of young men coinfecting with HIV and ES, many had detectable viral loads collected near the time of syphilis diagnosis, suggesting the potential for HIV transmission.

Keywords

syphilis; HIV; viral load; coinfection; treatment

Introduction

The HIV epidemic in the United States continues to disproportionately affect men who have sex with men (MSM), representing an estimated 63% of newly diagnosed HIV infections in the United States and 78% of infections among all newly diagnosed men.¹ Youth (aged 13–24 years) accounted for 25.7% of new HIV diagnoses in 2010.² Of these, 72.1% were

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Declaration of Conflicting Interests

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attributed to male-to-male sexual contact.² The epidemiology of infectious syphilis cases mirrors that of new HIV/AIDS infections. Primary and secondary (P&S) syphilis diagnoses have been increasing nationally, particularly among MSM who represented 62% of all P&S cases in 2009.³ In 2011, MSM accounted for 72% of all P&S syphilis cases, and the rate of men (aged 20 to 24) with P&S syphilis has steadily increased from 20.2 per 100 000 cases in 2009 to 23.4 per 100 000 cases in 2011.³ Men aged 20 to 24 accounted for the highest rates of P&S compared to any age-group in 2011.³ The proportion of MSM P&S cases that are coinfecting with HIV has been reported to be as high as 65%.³

Reflecting national trends, in 2011, approximately 62% of all new HIV/AIDS diagnoses in Maricopa County, Arizona, were attributed to male-to-male sexual contact and 13.7% of newly diagnosed HIV/AIDS cases occurred among persons aged 20 to 24 years.⁴ During 2009 to 2012, 66% of early syphilis (ES) infections (primary, secondary, and early latent stages) in Maricopa County occurred among MSM and 20% of ES cases occurred among young men aged 20 to 24 years. In Maricopa County, the proportion of MSM presenting with ES infection that are coinfecting with HIV has increased from 34% to 51% during 2003 to 2011.⁵

The presence of a genital ulcer, a key characteristic of primary syphilis, increases the risk of HIV acquisition and transmission.⁶ Furthermore, HIV-infected persons with detectable HIV viral loads are known to pose a greater transmission risk as compared to those with undetectable viral loads.⁷ Overlapping epidemiology of these infections, along with high rates of coinfection, suggests opportunities for HIV transmission among young MSM populations. In order to assess HIV infectivity, we reviewed HIV viral loads of young men coinfecting with ES during 2009 to 2012.

Materials and Methods

Cases were selected from the Maricopa County STD surveillance Microsoft Access (Redmond, Washington) and PRISM (Tallahassee, Florida) databases based on the following criteria: (1) male or transgender, (2) 24 years of age or younger, (3) diagnosed with primary, secondary, or early latent syphilis between 2009 and 2012, and (4) simultaneously (syphilis diagnosis within 30 days of HIV diagnosis) or previously diagnosed with HIV. Demographic data, including age, race, and sexual preference, were abstracted from syphilis case reports.

HIV coinfection status was obtained by cross-matching cases of ES with the Arizona Department of Health Services (ADHS) HIV surveillance database (EHARS, US Centers for Disease Control and Prevention [CDC]). HIV diagnosis date, CD4 count, and HIV viral load data for the coinfecting patients were also abstracted from the ADHS HIV surveillance database. The CD4 counts and viral load results obtained closest to the date of syphilis diagnosis were abstracted. In this analysis, undetectable viral loads were defined as <100 copies/mL. Days elapsed between HIV diagnosis and ES diagnosis were calculated to determine whether patients were diagnosed with HIV before, at the same time, or after being diagnosed with syphilis. Patients diagnosed with syphilis first (more than 30 days before HIV diagnosis) were excluded from the analysis.

Analysis

Data were collected in Excel and Access, and a descriptive analysis was conducted using PASW (v 18; Chicago, Illinois).

The analysis of these data was for surveillance purposes and does not involve research on human subjects.

Results

Demographics and Clinical and Behavioral Characteristics

During 2009 to 2012, there were 1215 ES cases diagnosed in Maricopa County. Of these, 1098 (90%) were diagnosed among males and 798 male cases (73%) self-identified as MSM. Of the male cases with ES, 509 (46%) were HIV infected and 248 (23%) were diagnosed among men between the ages of 15 and 24. There were 56 HIV-infected, male cases with ES, who were less than 25 years of age and were diagnosed with syphilis near or after their HIV diagnosis. These cases represented 23% of male cases with syphilis in this age-group. The median age was 22 (range 18–24); 23 (41%) were Hispanic and 14 (25%) were African American. Gender of sexual partners was available for 96% (54) of the cases. Of these, 53 (98%) reported MSM behavior. Syphilis stages included 5 (9%) with primary; 23 (41%) with secondary; and 28 (50%) with early latent syphilis (Table 1).

Intervals of Infection

Of the 56 coinfecting cases, 22 (39%) were diagnosed with both HIV and syphilis within a 30-day interval. Of these cases, 4 (18%) were aged 15 to 19 years; 18 (82%) were aged 20 to 24 years; 6 (27%) were African American, and 9 (41%) were Hispanic. For 34 (61%) cases, the syphilis diagnosis was made >30 days after HIV diagnosis (range 4–67 months). Among these cases, 1 (3%) was of age 15 to 19 years; 33 (97%) of age 20 to 24 years; 8 (24%) were African American and 14 (41%) were Hispanic; 24 (71%) were diagnosed with HIV more than a year before syphilis diagnosis (Table 1).

Viral Loads and CD4 Counts

Of the 56 men in our study, 36 (64%) had a reported viral load performed within 1 year of syphilis diagnosis. Of these, 32 (89%) had a detectable viral load (median 21 000 copies/mL, range 130–302 844 copies/mL) and 4 (11%) had a reported viral load <100 copies/mL. Of patients with detectable viral loads performed within 1 year of syphilis diagnosis, 12 (38%) were white, 6 (19%) were African American, and 12 (38%) were Hispanic. Of the 56 total cases, 20 (36%) had no reported viral load or a viral load collected greater than 1 year of syphilis diagnosis. Of these patients, 4 (20%) were white, 8 (40%) were African American, and 8 (40%) were Hispanic. CD4 counts were available for 20 (36%) men (median 375 cells/mm³, range 28–862 cells/mm³; Table 1).

Discussion

Combining ES surveillance data with viral load data of HIV-infected patients allowed us to identify and describe an aspect of the infectivity of HIV-positive young men who were

simultaneously or subsequently diagnosed with ES. In this group of young men, most of whom are MSM, a majority had a detectable viral load (57%), were diagnosed with syphilis more than 30 days after being diagnosed with HIV (61%), and were of minority race/ethnicity (70%). Over one-third of the cases had no viral load tests recorded within 1 year of syphilis diagnosis. Using surveillance data, we identified a group of HIV-infected persons who are at increased risk of transmitting HIV, as indicated by simultaneous or subsequent diagnosis of syphilis in a setting of high viral loads. These data can inform efforts to improve HIV care and prevention outcomes in high-risk persons living with HIV/AIDS.

A majority of these patients had a detectable HIV viral load within 1 year of syphilis diagnosis, demonstrating increased risk of HIV transmission to uninfected partners. Detectable viral loads near the time of syphilis diagnosis indicate HIV infectivity, and unprotected sexual activity demonstrates an opportunity for transmission. Early syphilis infection is associated with increases in viral load, even among patients with detectable but diminished viral loads and among those receiving antiretroviral therapy (ART).^{8,9} National recommendations now include antiretroviral (ARV) treatment for all HIV-infected patients, and early initiation of ART has been shown to substantially reduce HIV transmission to uninfected partners.¹⁰⁻¹² Early syphilis diagnosis in the setting of detectable viral loads remains an indicator of sexual risk in patients who are infectious.^{7,13} Opportunities to refer these patients should be prioritized as a part of public health case investigation in addition to promptly identifying and treating uninfected partners.¹⁴

Nearly half (44%) of the patients in this study were diagnosed with HIV more than a year before being diagnosed with syphilis, indicating unprotected sexual contact and thus the potential for HIV transmission. In Arizona, an increase in the number of syphilis infections occurring among HIV-infected persons has been reported¹⁵; 90% of these infections occur at or after HIV diagnosis.¹⁵ In accordance with the CDC guidelines, these patients and their partners should be prioritized for HIV prevention efforts.^{14,16-18} Presumably, many of these patients are accessing 1 or more aspects of HIV care but have yet to achieve viral suppression. Identifying HIV-infected individuals who are subsequently diagnosed with sexually transmitted diseases (STDs) affords public health systems the opportunity to ensure referral and retention in HIV care that prioritizes ARV treatment.^{10,14,17-18}

Approximately 70% of cases in this study were young MSM from racial/ethnic minorities. African-American men comprised 25% of these young HIV-infected cases with syphilis, despite representing only 2% of the entire population in Maricopa County in 2010.²⁰ Hispanic males comprised 40% of cases within this study. Young African-American and Hispanic/Latino MSM have been identified as emergent risk groups for HIV infection and syphilis.²¹⁻²³ Younger age is associated with several measures of clinical nonadherence, and persons aged 13 to 24 represent a substantial proportion of poor care outcomes by several measures, including linkage to care and achieving viral suppression.²⁴⁻²⁶ These findings mirror national age and race trends of HIV and syphilis.^{1,2,22} Additionally, a majority of the clients with a detectable viral load or no available viral load were of minority race/ethnicity. Some implications of these findings include (1) minority clients may have limited compliance with linkage to primary HIV care once diagnosed with HIV and (2) acceptance of and compliance with ART may differ between race/ethnicity groups.²⁴⁻²⁷ Local data

support these findings, with lower rates of viral suppression having been reported among HIV-infected non-Hispanic blacks and Hispanics in comparison to non-Hispanic whites in Arizona, thereby reflecting gaps in HIV care in these communities.²⁵

There are several limitations to this analysis and the use and interpretation of these data. Underestimates of coinfections likely occurred due to several factors, including diagnosis and reporting delays. The proportion of patients simultaneously diagnosed with both infections could be due to an increase in routine screening of HIV and syphilis, and those who were diagnosed with HIV first may not have been tested for syphilis until after connecting to HIV care. Information regarding receipt of HIV ART was not obtained, thus medication adherence could not be evaluated. Some patients who were presumed to be lost to follow-up due to a lack of recent HIV laboratory data and who were later verified as being current to care have been reported in other jurisdictions. Conversely, some were validated as being lost to follow-up.²⁷ These discrepancies may have occurred in this population due to reporting delays and insufficient surveillance resources. Finally, the small sample size restricted our ability to do comparative analyses.

The potential for HIV transmission to uninfected partners within this group of young men is high, using ES diagnosis as a surrogate of sexual risk. Detectable HIV viral loads are clinical evidence that many of these young HIV-infected MSM had not yet achieved viral suppression near the time of syphilis diagnosis and thus remain infectious to sexual partners.^{7,11,13–14} Among patients with viral load values within 1 year of syphilis diagnosis, only 11% were undetectable. In comparison nationally, it is estimated that 28% of persons living with HIV/AIDS have an undetectable viral load.¹⁸

This study is the first to describe the potential for HIV transmission using HIV viral load data among a group of young MSM with syphilis. Access to HIV and syphilis surveillance registries, including syphilis case report data and HIV viral loads, allowed us to cross match and describe persons who had HIV around the time of syphilis diagnosis. Integrated surveillance and prevention efforts can be used to identify patients with incompletely suppressed viral loads and incident STD diagnoses. Public health programs may be able to use viral load data to monitor retention in HIV care, and STD diagnoses to monitor ongoing transmission risk.^{27–28}

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Table 1.

Demographics and Selected Characteristics among Men Coinfected with HIV and Early Syphilis, Aged 18 to 24 Years, Maricopa County, Arizona, 2009 to 2012.

Variable	Number (%)
Demographics	N = 56
Age, years	
Age-group 19	5 (9)
Age-group 20–24	51 (91)
Race	
Asian	1 (2)
Black	14 (25)
Hispanic	23 (41)
American Indian/Alaska Native	1 (2)
White	17 (30)
Syphilis stage	
Primary	5 (9)
Secondary	23 (41)
Early latent (< 1 year)	28 (50)
HIV diagnosis	
30 days before-30 days after syphilis diagnosis	22 (39)
31–365 days before syphilis diagnosis	10 (17)
More than 365 days before syphilis diagnosis	24 (44)
Viral load collection within 1 year of syphilis diagnosis	36 (64)
Undetectable (< 100 copies/mL)	4 (11)
Detectable (> 100 copies/mL)	32 (89)
CD4 collection within 1 year of syphilis diagnosis	20 (36)
Median, cells/mm ³	375
Range, cells/mm ³	28–862